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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,261	12/15/2003	Mitsugu Sato	H6808.0005/P005-A	1481

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DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP
2101 L Street, NW
Washington, DC 20037

EXAMINER	
JOHNSTON, PHILLIP A	
ART UNIT	**PAPER NUMBER**
2881	

DATE MAILED: 11/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/734,261	SATO ET AL.
	Examiner	Art Unit
	Phillip A. Johnston	2881

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 25 August 2005.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 24-34 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 24-34 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 15 December 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Detailed Action

1. This Office Action is submitted in response to RCE / Amendment filed 8-25-2005, wherein claims 1-23 were previously canceled. Claims 24, and 27-32 have been amended, and claims 33 and 34 have been added. Claims 24-34 are pending.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 24-31, 33 and 34 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,864,493. Although the conflicting claims are not identical, they are not patentably distinct from each other because it is obvious to one of ordinary skill in the art that all the limitations in claims 11-22 of Application No. 10734261 are contained in claims 1-24 of U.S. Patent No. 6,864,493. By way of example, a comparison of claims 24-26 of Application No. 10734261 with claim 2 of U.S. Patent No. 6,864,493 is included below.

Claims 24-26 of Application No. 10734261 read as follows;

24. (currently amended) A charged particle beam apparatus comprising: a charged particle source; an optical element for adjusting a charged particle beam emitted by the charged particle source; an alignment deflector for aligning the axis of the charged particle beam with respect to the optical element; and a control device for calculating a two dimensional deviation between images when said optical element is varied, wherein said control device determines a condition of the alignment deflector by varying the condition of the alignment deflector, and then calculates a signal supplied to the alignment deflector based on the determined condition of the alignment deflector.

25. (previously presented) The apparatus according to claim 24, wherein said control device detects a deviation that is detected when the condition of said optical element is varied, for each different condition of said alignment deflector.

26. (previously presented) The apparatus according to claim 25, wherein said control device calculates an unknown number indicating the relationship between said deviation and said alignment condition based on the deviation detected for said each different condition.

Claim 2 of U.S. Patent No. 6,864,493 reads as follows;

2. A charged particle beam alignment method which performs an axis alignment for an astigmatism corrector by an alignment deflector and uses a charged particle beam apparatus having an astigmatism corrector for performing an astigmatism correction of the charged particle beam emitted from a charged particle source and forming a sample image by detecting secondary charged particles emitted from a

sample by radiating said charged particle beam corrected by said astigmatism corrector onto the sample, the method comprising the steps of: changing a correction condition of said astigmatism corrector to two states when a deflection condition of said alignment deflector is rendered to a first state; detecting a first two dimensional deviation between first and second sample images obtained when the deflection condition of said alignment detector is rendered to the first state; changing the correction condition of said astigmatism corrector to at least two states when the deflection condition of said alignment deflector is rendered to a second state; detecting a second two dimensional deviation between third and fourth sample images obtained when the deflection condition of said alignment deflector is rendered to the second state; calculating an unknown changing depending on a condition of said charged particle beam by applying information of the first and second two dimensional deviations to an equation indicating the relation of an alignment condition and deviation of the sample images; and obtaining the alignment condition based on the calculated unknown and a condition in which an image deviation becomes small when the correction condition of the astigmatism corrector is changed to the two condition.

It is obvious to one of ordinary skill in the art that all the limitations in claims 24-31, 33 and 34 of Application No. 10734261 are for the most part, contained in Claims 1-15 of U.S. Patent No. 6,864,493, particularly since both use changing of an optical element relative to an alignment deflector condition to produce image deviations from which correcting signals are calculated and applied to the alignment deflector to bring the beam back to a desired axis during routine operation of the optical element.

4. Claims 24,29,30, and 32 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,838,667. Although the conflicting claims are not identical, they are not patentably distinct from each other because it is obvious to one of ordinary skill in the art that all the limitations in claim 24,29,30, and 32 of Application No. 10734261 are contained in Claims 1-17 of U.S. Patent No. 6,838,667. By way of example, a comparison of claims 24,29,30, and 32 of Application No. 10734261, with claim 1 of U.S. Patent No. 6,838,667 is included below.

Claims 24,29,30, and 32 of Application No.10734261, read as follows:

24. (currently amended) A charged particle beam apparatus comprising: a charged particle source; an optical element for adjusting a charged particle beam emitted by the charged particle source; an alignment deflector for aligning the axis of the charged particle beam with respect to the optical element; and a control device for calculating a two dimensional deviation between images when said optical element is varied, wherein said control device determines a condition of the alignment deflector by varying the condition of the alignment deflector, and then calculates a signal supplied to the alignment deflector based on the determined condition of the alignment deflector.

29. (currently amended) The apparatus according to claim 24 wherein said control device determines whether or not there is structure information necessary for the calculation of said deviation based on said image.

30. (currently amended) The apparatus according to claim 29, wherein said control device quantifies the presence or absence of said structure information necessary for the calculation of said deviation in said image.

32. (currently amended) The apparatus according to claim 30, wherein said control device effects quantification by a two-dimensional Fourier transform of said image.

Claim 1 of U.S. Patent No. 6,838,667 reads as follows:

1. An apparatus for charged particle beam microscopy comprising: a recording unit for recording a first charged particle beam image obtained when a focus of a lens for charged particle beam on a specimen is located in a first position and a second charged particle beam image obtained when said focus is located in a second position; a calculation unit for analyzing a positional displacement between said first and second charged particle beam images and a degree of coincidence indicating a degree of resemblance between said first and second charged particle beam images; a judgment unit for judging from said degree of coincidence whether said positional displacement can be converted into an axial displacement of a primary charged particle beam relative to said lens for charged particle beam; and an alignment unit for correcting said axial displacement of said primary charged particle beam relative to said lens for charged particle beam in response to an alignment signal calculated from said positional displacement, wherein said calculation unit calculates the degree of coincidence by calculating a Fourier transformation of said first and second charged particle beam images, calculating a phase difference of said Fourier transformed first

and second charged particle beam images, calculating an inverse Fourier transform of said phase difference, and calculating the degree of coincidence defined as an intensity of a Δ peak appearing in said inverse Fourier transformed phase difference.

It is obvious to one of ordinary skill in the art that all the limitations in claims 24, 29,30, and 32 of Application No. 10734261 are for the most part, contained in Claims 1-17 of U.S. Patent No. 6,838,667, particularly since both use Fourier transformation of image deviations (positional displacement) after changing of an optical element relative to an alignment deflector condition to correct beam alignment.

Claims Rejection – 35 U.S.C. 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 24-31, 33 and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,627,373, to Keese.

Keese (373) clearly discloses the following;

(a) Plural images are obtained using computer 40 to automatically vary the focus of objective lens 28 (optical element); i.e., varied positively and negatively between extremes of the focal range, which are equivalent to condition 1 and 2 of the objective lens as stated in paragraphs [0038] and [0040] of applicants published application No. 20040124364.

Then pattern recognition circuit 48 and control circuit 50 are used to calculate the amount of image translation for the images obtained at each of the extremes of the focus range, which is equivalent to calculating the image deviation or parallax between the images obtained at the extremes of the focus range of the objective lens, as defined in paragraphs [0056] and [0065] of applicants published application No. 20040124364. Then control circuit 50 generates alignment coil control signals LC1 and LC2 to alignment coils 22 (alignment deflectors) for adjusting electron beam alignment, as recited in claims 24,25,28,33, and 34. See Column 6, line 45-65.

(b) Pattern recognition circuit 48 analyzes detector signal FD for imaged features of specimen S, such as position in the field of view and sharpness of the edge image. For example, in one embodiment pattern recognition circuit 48 determines the absolute value of the peak first derivative of the smoothed image intensity of each raster scan line and derives an average over all scan lines. This information is contained in signal IND provided to control circuit 50. Control circuit 50 stores and analyzes signals IND, and calculates corrections to beam alignment and astigmatism. Control circuit 50 generates control signals LC1 and LC2 for automatically correcting beam alignment, and generates control signal ASC for automatically correcting beam astigmatism, as recited in claims 26,27, and 29-31. See Column 5, line 37-53; and Column 8, line 3-39.

It is implied herein that control circuit 50 calculates values that indicate the relationship between the amount of image translation and beam alignment, which

would include calculating a coefficient used to determine the magnitude of the control signal for the alignment coils (deflectors) 22, as recited in claims 26 and 27.

Claims Rejection – 35 U.S.C. 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,627,373, to Keese, in view of Onoguchi, U.S. Patent No. 6,067,164.

Keese (373) as applied above discloses all the limitations of claim 32 but fails to teach the use of a two-dimensional Fourier transform to quantify the image. However, Onoguchi (164) discloses an astigmatism correction apparatus for correcting an astigmatism in an electron optics device that utilizes a Fourier transform unit to obtain a binarized image; an axis extraction unit for obtaining a principal axis and an axis perpendicular to the principal axis of the binarized image; an astigmatism information calculation unit for determining an intensity and a direction of the astigmatism by obtaining a distance between two points at which a sample image region in the binarized image intersects with the principal axis and a distance between two points at which the sample image region in the binarized image intersect with the axis

perpendicular to the principal axis; and an adjustment unit for adjusting the stigmater of the charged particle beam optical system according to the intensity and the direction of the astigmatism determined by the astigmatism information calculation unit. See Column 4, line 65-67; Column 5, line 1-25; Column 19, line 51-67; and Column 20, line 1-3.

Therefore it would have been obvious to one of ordinary skill in the art that the electron beam alignment correction apparatus and method of Keese (373) can be modified to use the Fourier transform in accordance with Onoguchi (164), to apply a two-dimensional Fourier transform to the secondary particle signals, thereby adjusting the stigmater of the charged particle beam optical system according to the intensity and the direction of the astigmatism determined by the astigmatism information calculation unit.

Conclusion

9. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (571) 272-2475. The examiner can normally be reached on Monday-Friday from 6:30 am to 3:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor John Lee can be reached at (571) 272-2477. The fax phone number for the organization where the application or proceeding is assigned is 571 273 8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PJ

November 4, 2005